GUESS PAPER 2021

کامیابی کا تعویذ

پنجاب کے تمام بورڈ کے لیے (اعلیٰ نمبروں کے حصول کی ضمانت)

اب فیل ہونا بھول جائیں

ہم نے تو چراغ جلا کر سرِ راہ رکھ دیا

اب جس کے جی میں آئے وہی پائے روشنی

Guess papers are handy for practicing. You can solve many guess papers and get an idea about where you stand regarding your exam preparation. You can set a timer to practice Attempting questions within the required limit. With regular practice, your mistakes will be minimal and your speed will increase.

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TICK (✔) the Correct Option (100% Guaranteed)

1) The SI unit of electric intensity is
a) NC^{-1} ✔ b) Tesla c) N/M d) Coul / meter
2) Electric lines of forces are parallel and equally spaced then electric field is
a) Weak b) Strong c) Non uniform d) Uniform ✔
3) A charge of 1μC experience a force of 10-6 N at a point then the electric intensity at that point is
a) 10^6NC^{-1} b) $10^{-6}NC^{-1}$ c) $1NC^{-1}$ ✔ d) NC^{-1}
4) The lines which provide information about the electric force exerted on charged particles are
a) Magnetic field lines b) Electric field lines ✔ c) Tangent lines d) Curved lines
5) The electric field lines are closer where the field is
a) Strong ✔ b) Weak c) Uniform d) All of these
6) The electric field created by positive charge is
a) Radially inward b) Zero c) Circular d) Radially outward ✔
7) Another unit of electric intensity is
a) V / A b) V / m ✔ c) V / C d) V / N
8) Which one of the following can be taken as measure of electric field intensity
a) $\frac{F}{A}$ b) $\frac{\emptyset_e}{A}$ ✔ c) $\frac{A_q}{A}$ d) None of these
9) The unit of Electricity intensity other than NC-1
a) VA^{-1} b) Vm^{-1} ✔ c) VC^{-1} d) All of these
10) SI unit of strength of electric field
a) J / C b) C / V c) N / C ✔ d) All of these
11) Closeness of the electric field lines is the measure of
a) Cirection of field b) Strength of field ✔ c) both of these d) None of these
12) NC-1 is the SI unit of
a) Force b) Charge c) Current d) Electric intensity ✔
13) Then maximum value of flux is obtained if angle between and is
a) 900 b) 800 c) 1800 d) 00 ✔
14) Unit of electric intensity of electric field is
a) JC^{-1} b) JV^{-1} ✔ c) Jm^{-3} d) JI^{-3}
15) When an area is held perpendicular to the field lines then the magnitude of electric flux is
a) Negative b) Positive c) Maximum ✔ d) All of these
16) Electric flux through a closed surface does not depend upon
a) Its shape b) Medium ✔ c) Charge d) None
17) X-rays exhibit the phenomenon of:
a) Interference b) Diffraction c) Polarization d) All of these ✔
18) The continuous X-rays spectrum is produced by:
a) Accelerated electrons b) Decelerated electrons ✔ c) Inner shell electrons d) Valence electrons
19) For rectification we use:
a) Transformer b) Choke c) Diode ✔ d) Capacitor
20) In photovoltaic cell current is directly proportional to:
a) Wavelength of light b) Frequency of light c) Intensity of light ✔ d) Energy of light
21) 1 joule =
a) 6.25×10^{18} e V ✔ b) 6.30×10^{18} e V c) 7.25×10^{18} e V d) 9.1×10^{18} e V
22) The electrons volt is the unit of
a) Electric current b) Electric energy ✔ c) Potential d) Potential difference
23) Capacitance of a capacitor does not depend upon
a) Distance between plates b) Area of plates c) Electric field between plates ✔ d) Medium between plates
24) A capacitor is perfect insulator for
a) Alternating current b) Sparking current c) Eddy current d) Direct current ✔
25) Coulomb per volt is called
a) Farad ✔ b) Ampere c) Joule d) Henry
26) The capacitance of capacitor depends upon
a) Thickness of plates b) Charges of plates c) Geometry of the capacitor ✔ d) All of these
27) Operational amplifier can be used as:
a) Night switch b) Comparator c) Amplifier d) All of the above ✔
28) The first superconductor was discovered in:

a) 1911 ✔ b) 1932 c) 1954 d) 1963

29) An example of Ferromagnetic substance is:

a) Co ✔ b) Al c) Cu d) Bi

30) The numerical value of green colour in colour code resistor is

a) 3 b) 4 c) 5 ✔

31) The color of strips on a a carbon resistor from extreme left is yellow black and red respectively its resistance is

a) 4 kΩ ✔ b) 5 kΩ c) 6 kΩ d) 7 kΩ

32) In colour code of resistance orange colour represents

a) 1 b) 2 c) 3 ✔

33) If fourth band is missing on resistance its tolerance is

a) ± 5 b) ± 6 c) ± 7 d) ± 20% ✔

34) The current always leads the voltage in an

a) RC circuit ✔ b) RL circuit c) RLC series circuit d) RLC parallel circuit

35) Colour code of yellow colour is

a) 2 b) 3 c) 4 ✔ d) 5

36) Resistance tolerance for gold colour is

a) 50% b) 30 %c) 5% ✔ d) 20 %

38) Kirchhoff's first rule is based on conversation of

a) Energy b) Voltage c) Charge ✔ d) Mass

39) Kirchhoff's second rule is based on

a) Energy conversation ✔ b) Mass conversation c) Charge conversation d) Momentum conversation

40) The field inside a solenoid is given by

a) $\mu_0 nI$ ✔ b) $2\mu_0 nI$ c) $3\mu_0 nI$ d) All of these

41) The motional emf is given by

a) qvB b) IBL c) eBL d) vBL ✔

42) The rod of unit length is moving at 300 through a magnetic field of 1 T . If velocity of rod is 1 m/s , then induced emf in the rod will be given by

a) 1 V b) 0.2 V c) 0.5 V ✔ d) 0.6 V

43) In current carrying long solenoid the magnetic field produced does not depend upon

a) The radius of solenoid ✔ b) Number of turns per unit length c) Current flowing through solenoid d) All of the above

44) The magnetic field inside a current carrying long solenoid is

a) Non uniform b) Weak c) Uniform and Strong ✔ d) Zero

45) The motional emf in a conductor depends upon the.

a) Length b) Orientation c) Magnetic field d) All of the above ✔

46) A rod of length 20 m is moving with 20 m/s in a direction perpendicular to magnetic field of 20 T what is the value of emf.

a) 2000 V b) 4000 V c) 6000 V d) 8000 V ✔

47) The relation is known as.

a) Ampere's law b) Faradya's law ✔ c) Lenz's law d) Kickoff's law

48) The negative sign with induced emf in Faraday's law is in accordance with

a) Lenz's law ✔ b) Ampere's law c) Gauss's law d) Induced emf

49) Electromagnetic Induction obeys Law of Conservation of

a) Charge b) Energy ✔ c) Momentum d) Mass

50) Lenz's law is a consequence of the law of conservation of

a) Charge b) Current c) Energy ✔ d) Momentum

51) Lenz's law deals with

a) Magnitude of emf b) Direction of emf c) Direction of induced current ✔ d) Magnitude of induced current

52) Henry is SI unit of

a) Current b) Resistance c) Flux d) Self induction ✔

53) Mutual induction between two coils depends upon their

a) Size b) Shape c) Separation d) All of these ✔

54) Inductance of the coil can be increased by using.

a) Paramagnetic core b) Diamagnetic core c) Ferromagnetic core ✔ d) Antiferromagnetic core

55) Mutual induction has a practical role in the performance of the

a) Radio Choke b) Transformer ✔ c) A.C Generator d) D.C Generator

56) An inductor may store energy in

a) Its magnetic field ✔ b) Its electric field c) Its coil d) A neighboring circuit

57) Energy density is an inductor is .

a) Directly proportional to magnetic field b) Directly proportional to square of magnetic field✔ c) Inversely proportional to magnetic field d) Inversely proportional to square of magnetic field

58) The Lorentz force on a charged particle moving in electric field B is given by

a) $F = F_E + F_B$ ✔ b) $F = F_E - F_B$ c) $F=F_BF_E$ d) All of these

59) The sum of electric and magnetic force is called

a) Maxwell force b) Lorentz force ✔ c) Newton's force d) Centripetal force

60) Energy stored in the inductor is .

a) $\frac{1}{2}L^2I$ b) $\frac{1}{2}LI$ c) $\frac{1}{2}LI^2$ ✔ d) $\frac{1}{2}L^2I^2$

61) If an inductor has N turns of a coil and is magnetic flux through its each turn when current I is following , then its self - inductance is given by L.

a) $\frac{I}{N\emptyset}$ b) $\frac{N\emptyset}{I}$ ✔ c) $\frac{NI}{\emptyset}$ d) $\frac{\emptyset}{NI}$

62) Neutrons was discovered by

a) Rutherford b) Chadwick ✔ c) Becquerel d) Curie

63) Which of the following is similar to electron

a) β- particle ✔ b) α-particles c) Neutrino d) Photon

64) Color television emits

a) - rays b) γ-rays c) X- rays ✔ d) All of these

65) By emitting β particle and γ particle simultaneously the charge number of the nucleus

a) Losses by 1 b) Losses by 2 c) Increases by 1 ✔ d) Increases by 2

66) Radioactivity happens due to disintegration of

a) Nucleus ✔ b) Mass c) Electrons d) Protons

67) Which one is more energetic

a) γ-rays ✔ b) x-rays c) Ultra violet rays d) None of these

68) γ rays emitted from radioactivity elements have speed

a) 1×10^7 ms^{-1} b) 2×10^7 ms^{-1} c) 3×10^7 ms^{-1} d) 3×10^8 ms^{-1} ✔

69) -particles carry a charge

a) -e b) +2e ✔ c) -2e d) no charge

70) When a β particle is emitted out of any nucleus then its mass number is

a) Unchanged ✔ b) Increased c) Decreased d) Infinite

71) When a nucleus emits alpha particle its atomic mass decreases by

a) 3 b) 32 c) 4 ✔ d) 2

72) The mass of beta particle is equal to mass of

a) Electron ✔ b) Proton c) Neutron d) Meson

73) Marie curie and pierre curie discovered

a) Uranium b) Polonium and radium ✔ c) Uranium and radium d) All of these

74) Half life of the iodine -131 is 8 days and its weight 20 mg. After 4 half lives the amount life undecayed called

a) 2.5 mg b) 1.25 mg ✔ c) 0.625 mg d) All of these

75) After two half-lives the number of decayed nuclei of an element are

a) $\frac{4}{16}$ b) $\frac{5N}{16}$ c) $\frac{7N}{16}$ d) $\frac{3N}{4}$ ✔

76) A device which show the visible path of ionizing particle is called

a) Wilson cloud Chamber ✔ b) Scalar c) G.M counter d) All of these

77) A high potential difference of is used in G.M counter

a) 400 volts ✔ b) 40000 volts c) 5000 volts d) 4400 volts

78) The total amount of energy radiated per unit orifice area of cavity radiator per unit time proportional to

a) T b) T^2 c) T^3 d) T^4 ✔

79) A detector can count fast and operate low voltage is

a) G.M counter b) Solid state detector ✔ c) Bubble chamber d) All of these

80) The dead time of Geiger Muller counter is of the order

a) 10^{-1} s b) 10^{-2} s c) 10^{-3} s d) 10^{-4} s ✔

81) Nuclear fission chain reaction is controlled by using

a) Steel rods b) Graphite rods c) Cadimum rods ✔ d) None of these

82) Which of the following belong to hadrons group

a) Proton ✔ b) Electron c) Muons d) All of these

84) Particles that experience the strong nuclear force

a) Hadrons ✔ b) Leptons c) Photons d) Quarks

85) The particles equal in mass or greater than protons are called

a) Leptons b) Baryons ✔ c) Mesons d) Mouns

86) A pair of quark and anti quark make a

a) Meson ✔ b) Harden c) Lepton d) Baryon

87) Every particles has corresponding antiparticles with
a) Same mass b) Different mass c) Opposite mass d) Opposite mass ✔and Same mass
88) The number of types of quark is
a) 6✔ b) 5 c) 4 d) 2
89) Which of t he following are not hadrons?
a) Muons ✔ b) Mesons c) Protons d) Neutrons
90) Absorbed Dose D is defined as
a) M/E b) E/C c) C/m d) E/M ✔
91) A proton consist of quarks which are
a) 2 up 1 down ✔ b) 1 up 2 down c) all up d) all down
92) Which one is a better shield against gamma rays
a) Wood b) Lead ✔ c) Water d) All of these
93) The building blocks of protons and neutrons are called
a) Ions b) Quarks ✔ c) Positrons d) Electrons
94) The bombardment of nitrogen with alpha particle will produce
a) Neutron b) Proton ✔ c) Positron d) Electron
95) The half life of radon gas is
a) 3.8 hours b) 3.8 minutes c) 3.8 days ✔ d) All of these
96) The particles which do not experience strong force are called
a) Leptons ✔ b) Mesons c) Hadrons d) Baryons
97) The force which is responsible for the breaking up of the radioactive element is
a) Weak nuclear force ✔ b) Strong nuclear force c) Electromagnetic force d) Gravitational force
98) Various types of cancer are treated by
a) Carbon - 14 b) Nickel -63 c) Cobalt - 60✔ d) Strontium -90
99) The Rest Mass Energy of an electrons pair is
a) 0.51 Mev b) 1.02 Mev ✔c) 1.2 Mev d) 1.00 Mev
100) 0.1 Kg mass will be equivalent to energy
a) 5×10^8 J b) 9×10^8 J c) 8×10^8 J d) 9×10^{16} J ✔
101) The specially designed solid state detector can be used to detect
a) Alpha rays b) Beta rays c) Gamma rays only ✔ d) X- rays only
102) The brightness of the spot on CRO screen is controlled by
a) Cathode b) Anode c) Grid✔ d) Plato
103) In CRO , the output wave form of time base generator is
a) Circular b) Square c) Sinusoidal d) Saw - tooth ✔
104) The velocity of an oscillating charge as it moves to and fro along the wire is
a) Changing✔ b) Constant c) Infinite d) Zero
105) Cathode Ray Oscilloscope works by deflecting beam of
a) Neutrons b) Electrons ✔ c) Protons d) Positrons
106) The total energy of electron in the state $n = \infty$ of the hydrogen atom is
a) Zero ✔ b) 3.2 ev c) 10.2 ev d) 13.6 ev
107) Filament in C.R.O
a) Conductors ✔ b) Insulators c) Perfect conductors d) Perfect insulators
108) If an electron of charge " e" is accelerated through a potential difference v , it will acquire energy
a) Ve ✔b) V/2 c) E/V d) Ve^2
109) An electron in H atom is excited from ground state on n=4 How many spectral lines are possible in this case
a) 6 ✔ b) 5 c) 4 d) 3
110) The function of three anodes in a C.R.O is.
a) To accelerate electrons only b) To focus the electrons only c) To control the brightness of spot on screen d) To accelerate and focus the electrons ✔
111) The radius of 10th orbit in hydrogen atom is
a) 0.053 nm b) 0.053 m c) 5.3 nm ✔ d) 53 nm
112)
The numerical value of ground state energy for hydrogen atom in electron volt is
a) 2.51ev b) - 0.85 ev c) 3.50 ev d) -13.6 ev ✔
113) When an electron absorbs energy it jumps to
a) Lower energy state b) Higher energy state ✔ c) Ground state d) Remains in the same state
114) Speed of electron in first bohr's orbit is
a) 2.19×10^6 ms-1 ✔ b) 2.19×10^{-6} ms-1 c) 2.19×10^6 cms-1 d) None of these
115) Hydrogen atom spectrum does not lie in
a) Ultra violet region b) Visible region c) Infra and region d) X-ray region ✔

116) If electrons jumps from second orbit to first orbit in hydrogen atom it emits photon of
a) 3.40 eV b) 10.20 eV ✔ c) 13.6 eV d) 3.8 eV
117) The speed of an electron in nth orbit is given as
a) $\frac{2\pi Ke^2}{nh}$ ✔ b) $4\pi Ke^2$ c) $3\pi Ke^2$ d) All of these
118) Which one of the following radiation is extremely penetrating
a) Y- rays ✔ b) X- rays c) Alpha- rays d) Gamma- rays
119) In an electronic transition an atom cannot emit
a) γ-rays ✔ b) Infared rays c) UV- rays d) X-rays
120) The Rest Mass of X-rays photon is
a) 9.1×10^{-31}kg b) 1.66×10^{-27} kg c) 1.6×10^{-19} kg d) Zero ✔
121) X-rays are similar in nature to
a) Alpha rays b) Beta rays c) Cathode rays d) Gamma rays ✔
122) X-rays photon moves with a velocity of
a) Light ✔ b) Sound c) Force d) Power
123) X-rays are the electromagnetic radiations having the wavelength in range
a) 10^{-10}m ✔ b) 10^{-8}m c) 10^{-5}m d) 10^{-3}m
124) Photos emitted in inner shell transition are
a) Continuous X-rays b) Discontinuous X-rays c) Characteristics X-rays ✔ d) None of these
125) In AVO meter the current is measure when number of low resistance are connected with galvanometer in
a) Series b) Parallel ✔ c) Series and parallel d) Perpendicular
126) Radiation emitted by human body at normal temperature 37^0 C lies in
a) X-rays region b) Infra red region ✔ c) Visbile region d) Ultraviolet region
127) Useful device to measure resistance current and voltage is an electronic instrument called
a) Voltmeter b) Ammeter c) Ohmmeter d) Digital ✔Multimeter
128) In an AC circuit with resistor only the current and voltage have a phase difference of
a) 180^0 b) 90^0 c) 0^0 ✔ d) 60^0
129) In pure resistive AC circuit the instantaneous values of current and voltage are
a) In phase ✔ b) Out of phase c) Perpendicular to each other d) May or may not be in phase
130) Direct current cannot flow through
a) Inductor b) Resistor c) Transistor d) Capacitor ✔
131) The reactance Xc of a capacitor C when connected across an AC source of frequency " f " is given by
a) $2\pi fc$ b) $\frac{1}{2\pi fc}$ ✔ c) $\frac{2\pi f}{c}$ d) $\frac{c}{2\pi f}$
132) In the capacitive circuit connected to AC source, when q = 0 the slope of q-t curve is
a) Maximum ✔ b) Minimum c) Zero d) Negative
133) Capacitor will have a large reactance at
a) Low frequency ✔ b) High frequency c) Zero frequecny d) Negative frequency
134) The slope of q-t curve at any instant of time gives
a) Current ✔ b) Voltage c) Charge d) Both A & B
135) At high frequency the value of reactance of capacitor will be
a) Small ✔ b) Zero c) Large d) Infinite
136) In case of capacitor , the unit of reactance is
a) Ohm ✔ b) Mho c) Farad d) Henry
137) $100\ \mu F$ capacitor is connected to an AC voltage of 24 V and frequency 50 Hz . The reactance of the capacitor is
a) 30.8 Ω b) 31.8 Ω ✔ c) 34.8 Ω d) 40 Ω
138) In pure capacitor AC circuit , the current I and charge q are
a) In phase b) Out of phase ✔ c) Parallel to each other d) None of these
139) A device that allows only the flow of DC through a circuit is
a) Inductor ✔ b) Capacitor c) AC generator d) Transformer
140) Inductive reactance of an inductor is
a) b) c) ✔ d)
141) A.C through inductor , the applied voltage
a) Leads the current by $\frac{\pi}{2}$ ✔ b) legs the current by $\frac{\pi}{2}$ c) And Current are in Phase d) And Current is out of phase 180^0
142) The reactance of an inductor is
a) $X_L = \pi fL$ b) $X_L = 4\pi fL$ c) $X_L = 2\pi fL$ ✔ d) $X_L = \pi L$ ✔
143) The phase difference between current and voltage in an inductive circuit is
a) Zero b) 90^0 ✔ c) 180^0 d) 45^0
144) When an inductor comes close to a metallic object , its inductance is
a) Decreased ✔ b) Increased c) Becomes half d) Becomes 4 items

145) Which consumes small power ?
a) Inductor ✔ b) Resistor c) Motor d) All of them
146) The inductiance of a coil can be increased by using
a) Air as core metrial b) Iron as core material ✔ c) Copper as core material d) Bismith as core material
147) When an RC circuit is connected across a battery amount of charge deposited on plates is _______ times the equilibrium charge after one time contant
a) 0.63 ✔ b) 0.67 c) 0.75 d) 0.86
148) In LC series circuit the phase angle between XL and XC is
a) $\tan^{-1}\frac{\omega L}{R}$ b) $\tan^{-1}\frac{R}{\omega L}$ c) $\tan^{-1}\frac{\omega c}{R}$ d) $\pi\, rad$ ✔
149) The power factor of an AC circuit is given by
a) cosθ ✔ b) sinθ c) tanθ d) θ
150) The power dissipated in AC circuit is given by P = I_{rms} V_{rms} $cos\,\theta$ in this relation cos \theta is called
a) Phase factor b) Gain factor c) Loss factor d) Power factor ✔
151) The power dissipation in AC circuit is expressed as
a) $P = I_{rms} \times V_{rms}\, cos\,\theta$ ✔ b) $P = I \times V\, cos\, 2\theta$ c) $P = I_{rms} \times V_{rms}\, sin\,\theta$ d) $P = I \times V\, sin\, 2\theta$
152) Power factor in pure resistive circuit is
a) Largeb) Smallc) Infinite d) One ✔
153) In RLC series resonance circuit , at resonance frequency , impedance " Z " is
a) R ✔ b) X_L c) $\sqrt{R^2 + X_l^2}$ d) $\sqrt{R^2 + X_c^2}$
154) In R-C-L series circuit , the current at resonance frequency is
a) Minimum b) Zero c) Maximum ✔ d) Infinite
155) At resonance the value of current in RLC series circuit is equal to
a) $\frac{V_0}{R}$ ✔ b) $\frac{1}{2}$ c) V_0R d) Zero
156) At resonance frequency the impedance of RLC series circuit is
a) Zero b) Minimum ✔ c) Maximum d) Moderate
157) In RLC -- series circuit , at resonance frequency XC and XL are
a) In phase b) Opposite in phase ✔ c) Differ by a phase $\frac{\pi}{2}$ d) At angle of 120^0
158) In three phase voltage across any two lines is about
a) 220 V b) 230 V c) 400 V✔ d) 430 V
159) In a three phase AC generator the phase difference between each pair of coil is
a) 45^0 b) 60^0 c) 90^0 d) 120^0 ✔
160) Reciprocal of bulk modulus is
a) Elasticity b) Young modulus c) Compressibility ✔ d) Shear modulus
161) Nm-2 is also called
a) Telsa b) Weber c) Pascal ✔ d) Gauss
162) Shear modulus is expressed as
a) $G = \frac{tan\theta}{F/A}$ c) $G = \frac{tan\theta}{A}$ ✔ c) $G = \frac{F/A}{tan\theta}$ d) $G = \frac{F}{tan\theta}$
163) Dimensions of strain are
a) L^2 b) L^{-2} c) $ML^{-1}T^{-2}$ d) No dimensions ✔
164) How many crystal system are there on the base of geomertic arrangements of the atoms
a) 3 b) 5 c) 4 d) 7 ✔
165) Out of the following which material is brittle
a) High carbon steel ✔ b) Aluminum c) Copper d) Tungsten
166) Strain energy in deformed material is proportional to
a) Square of the extension b) Under root of the extension c) Cube root of the extension d) Extension produced ✔
167) The amount of energy stored in the wire when it is deformed
a) $w = \frac{1}{2}F_1 l_1^2$ b) $w = \frac{1}{2}F_1^2 l_1^2$ c) $w = \frac{1}{2}F_1 l_1$ ✔ d) None
168) The stress that produces change in shape in known as
a) Tensile stress b) Shear stress ✔ c) Volume stress d) Longitudinal stress
169) Chose the correct answer.
a) An elastic deformation is reversible ✔ b) An elastic deformation is irreversible c) A plastic deformation is reversible d) An elastic deformation is permanent
170) Substances which undergo plastic deformation until they break are known as
a) Brittle Substance b) Non - Magnetic substance c) Ductile Substance ✔ d) Magnetic Substance
171) Which of the following does not undergo plastic deformation ?

a) Copper b) Iron c) Lead d) Glass ✔
172) Substances which break just after the elastic limit is reached area called as
a) Ductile Substances b) Hard Substances c) Brittle Substances ✔ d) Soft Substances
173) The critical temperature for mercury is
a) 7.2 k b) 4.2 k ✔ c) 1.18 k d) 3.7 k
174) The critical temperature of aluminum is
a) 3.72 k b) 1.18 k ✔ c) 7.2 k d) 8.2 k
175) The substance in which the atom do not form the magnetic dipoles are called
a) Diamagnetic ✔ b) Paramagnetic c) Ferromagnetic d) Crystals
176) The coercive current is
a) Magnetizing current b) Current due to holes c) Demagnetizing current ✔ d) Current due to ions
177) Domains are existed in
a) Ferromagnetic materials ✔b) Paramagnetic materials c) Diamagnetic materials d) Semi conductors
178) The most suitable metal for making permanent magnet is
a) Steel ✔ b) Iron c) Copper d) Aluminum
179) Pulsating DC can be made smooth by using a circuit known as
a) Filter ✔ b) Tank c) Accepter d) All of these
180) In a half wave rectifier the diode conducts during
a) Both halves of input cycle b) A portion of positive half of input cycle c) A portion of negative half of input cycle d) One half of the input cycle ✔
181) Which diode works at reverse biasing?
a) LED b) Photo diode ✔ c) Photovoltaic cell d) Silicon diode
182) LED are made from semiconductor:
a) Silicon b) Germanium c) Carbon d) Gallium arsenide ✔
183) A sensor of light is
a) Transistor b) LED c) Diode d) Light dependent ✔resistor
184) The colour of light emitted by a LED depends on
a) Its forward biasing b) The amount of forward current c) The type of semi conductor material use ✔ d) Its reverse biasing
185) Photo diode is used for detection of
a) Heat b) Charge c) Light ✔ d) Current
186) Voltage gain of the transistor as an amplifier is negative because of
a) Input voltage is amplified b) Out put voltage is amplified c) Phase shift of 1800 ✔ d) Phase shift of 00
187) The gain of transistor amplifier depends upon
a) R_c ✔ b) R_B c) V_{in} d) V_o
188) Transistor can be used as:
a) Amplifier b) Switch ✔ c) Thermistor d) Both a and b ✔
189) A device which converts low voltage(or current) to high voltage (or current) is called
a) Rectifier b) Amplifier ✔ c) Transistor d) Diode
190) Which region is grounded in a common emitter amplifier?
a) Base b) Emitter ✔ c) Collector d) None of these
191) The voltage gain of the common emitter npn-transister is derived using:
a) Lenz's law b) Kirchhoff's law ✔ c) Coulomb's law d) Faraday's law
192) The Compton shift in wavelength will be maximum when angle of scattering is
a) 30^0 b) 45^0 c) 90^0 d) 180^0 ✔
193) Integrated amplifier is known as
a) Power amplifier b) Pull-push amplifier c) Perational amplifier ✔ d) Current amplifier
194) The pair production is also called
a) Pair annihilation b) Materialization of energy ✔ c) Fusion reaction d) Fission reaction
195) Gain of operational amplifier is independent of
a) Internal structure ✔ b) External structure c) Batteries d) Potential changes
196) The open loop gain of an operational amplifier is of the order of
a) 10^8 b) 10^5 ✔ c) 10^2 d) 10^{-3}
197) The device which is used as amplifier and works with negative feedback is
a) Operational amplifier ✔ b) n-p-n transistor c) p-n-p transistor d) Transistor
198) The input resistance of an op-amplifier is
a) Zero b) Low c) High ✔ d) Equal to output resistance
199) Potassium cathode in photocell emits electrons for a light
a) Visible ✔ b) Infrared c) Ultraviolet d) X-rays
200) Photoelectric current depends on

a) Intensity of light ✔ b) Frequency of light c) Speed of light d) Polarization of light

201) Gain of non-inverting amplifier is given by:

a) $G = - R_2/R_1$ b) $G = R_1/R_2$ c) $G = 1 + R_2/R_1$ ✔ d) $G = 1 + R_1/R_2$

202) Compton effect observed with

a) x-rays ✔ b) Visible light c) Radio waves d) All of these

203) Compton shift is equal to Compton wavelength when the scattered x-rays photons are observed at an angle of

a) 30^0 b) 0^0 c) 90^0 ✔ d) 60^0

204) An electric eye operates because of

a) Compton effect b) Photon refraction c) Photo electric effect d) I-Radiations ✔

205) Maximum kinetic energy of photoelectrons depend upon of incident light

a) Frequency ✔ b) Intensity c) Brightness d) Power

206) The amount of energy required to eject an electron from metal surface is called

a) Threshold frequency b) Work function ✔ c) Pair production d) Compton Effect

207) Production of x-rays can be regarded for a photon to create an electron positron pair is

a) 1.02 Mev ✔ b) 1.51 Mev c) 1.22 Mev d) 1.15 Mev

208) The condition $hf > 2m_0 C^2$ refers to

a) Compton Effect b) Pair production ✔ c) Photoelectric effect d) Annihilation of matter

209) The number of electrons emitted depends upon

a) Color of target surface b) Shape of surface c) Intensity of incident light ✔ d) Frequency of incident light

210) At higher energies more than 1.02 Mev the dominant process is

a) Photoelectron effect b) Compton Effect c) Pair production ✔ d) Nuclear fission

211) Disintegration of photon on striking a nucleus into an electron and positron is

a) Annihilation of matter b) Compton effect c) Pair production ✔ d) Photon electric effect

212) Two photons approach each other their relative speed will be

a) 2 c ✔ b) 3 c c) c d) zero

213) Antiparticle of electron is

a) Proton b) Photon c) Neutron d) Positron ✔

214) In order to increase the K.E of ejected photo electron there should be an increase in

a) Intensity of radiation b) Wavelength of radiation c) Frequency of radiation ✔ d) Both b and c

215) The rest mass energy of an electron positron pair is

a) 1.02 MeV✔ b) 0.21 MeV c) 0.31 MeV d) 0.41 MeV

216) Rest mass energy of a positron is given by

a) 2 MeV b) 0.51 MeV✔ c) 1.02 MeV d) 5 MeV

217) The unit of Compton shift is:

a) Js b) m✔ c) kg d) N

218) The existence of Positron in 1928 was predicted by

a) Anderson b) Dirac ✔ c) Chadwick d) Plank

219) The maximum kinetic energy of emitted photo electrons depends upon

a) The intensity of incident light b) Frequency of incident light c) Metal surfaced) Both Frequency of incident light and Metal surface✔

220) Who explained the photo electric effect

a) Max plank ✔ b) Einstein c) Henry d) Rutherford

221) Wave length λ associated with the particle of mass m and moving with the velocity v is

a) $\frac{h}{mv}$ ✔ b) $\frac{2h}{mv}$ c) $\frac{mh}{h}$ d) None of these

222) Davisson and Germer indicates in their experiment

a) Electron polarization b) Electron diffraction ✔ c) Electron reflection d) Electron refraction

223) The principle regarding the dual nature of light was first discovered by

a) De-Broglie ✔ b) J.J Thomson c) Campton d) Heisenberg

224) Which one experiment is the verification of wave nature of particle?

a) Compton effect b) Davisson Germer experiment✔ c) Pair production d) Photoelectric effect

225) We can find from de Broglie formula

a) Wave length ✔ b) Amplitude of wave c) speed of wave d) Frequency of wave

226) Wave nature of light appears in

a) Pair production b) Compton effect c) Speed of wave d) Interference ✔

227) ...has the largest de Broglie wave length at same speed

a) Proton b) Alpha particle c) Gamma particle d) Electron ✔

228) X-rays diffraction reveals that these are

a) Particle type b) Wave type✔ c) Both of these d) None of these

229) For a nucleus x is given as 1.0×10^{-14} m If the electron remain inside the nucleus then its vibrational velocity should be

a) Less than the speed of light b) Equal than the speed of light c) Greater than the speed of light ✔ d) Double than the speed of light
231) The product of resistance and capacitance is :
a) velocity b) force c) acceleration d) time ✔
232) In a time constant, the amount of charge deposit on a capacitor is:
a) 63% of equilibrium charge✔ b) 37% of equilibrium charge c) 69% of equilibrium charge d) 39% of equilibrium charge
233) The energy stored in the capacitor is :
a) Magnetic energy b) Electrical energy✔ c) Gravitational energy d) Mechanical energy
234) Energy density is:
a) Energy/volume ✔ b) Energy/time c) Energy/mass d) Energy/area
235) Will capacitor store more energy with dielectric other than air?
a) No b) Yes ✔ c) May be or may be not d) None of these
236) The charging time of capacitor depends upon
a) $\frac{R}{C}$ b) $\frac{C}{R}$ c) RC ✔ d) $\sqrt{RC}$
237) If potential difference across the two plates of a parallel plate capacitor is doubled then the energy stored in it will be
a) Doubled b) Halved c) 4 times ✔ d) Constant
238) When some dielectric is inserted between the plates of a capacitor then capacitance
a) Decrease b) Increase ✔ c) Remain Constant d) Infinite
239) Which material should be inserted between the plates of a capacitor in order to increase its capacitance
a) Copper b) Tin c) Mica ✔ d) Iron
240) The amount of energy is equal to 1.6×10^{-19} J is called
a) Electron energy b) Electric potential c) Electron volt ✔ d) Electric force
241) Gauss's law can only be applied to:
a) A curved surface b) A flat surface c) A closed surface ✔ d) Surface of any shape
242) Intensity of field inside a hollow charged sphere will be
a) Negative b) Positive c) Zero ✔ d) Infinity
243) Equation $\emptyset = \vec{E}.\vec{A}$ is applicable to the surface
a) Conical b) Flat ✔ c) Spherical d) All of these
245) The magnitude of electric intensity between near an infinite sheet of charge is
a) $\frac{\epsilon_0}{2\sigma}$ b) $\frac{\epsilon_0}{\sigma}$ c) $\frac{\sigma}{2\epsilon_0}$ ✔ d) $\frac{\epsilon_0}{3\sigma}$
246) If a closed surface contains two equal and opposite charges, the net electric flux from the surface will be:
a) Positive b) Negative c) Zero ✔ d) Both a and b
247) A rheostat can be used as:
a) Capacitor b) Potential divider ✔ c) Transistor d) Thermistor
249) Thermistor with high negative temperature coefficient are very accurate for measuring low temperature near
a) 10K ✔ b) 10 °F c) 10 °C d) -10 °C
250) What is the resistance of a carbon resistor which has bands brown black and brown
a) 100 ohm ✔ b) 1000 ohm c) 10 ohm d) 1.0 ohm
251)
Potentiometer can be used as
a) Potential divider ✔ b) Ohmmeter c) Ammeter d) Both b and c
252) Potentiometer practically draws current of amount:
a) Zero ✔ b) Small c) Large d) Infinite
253) Wheatstone bridge is an arrangement consisting of.............resistance
a) 2 b) 3 c) 4 ✔ d) 5
254) The resistance of a 60 Watt bulb in a 120 V line is:
a) 20 ohm b) 2 ohm c) 240 ohm ✔ d) 0.5 ohm
255) 1kWh =
a) 3×10^5 Joule b) 3.6×10^6 Joule ✔ c) 3.5×10^7 Joule d) 3.6×10^7 Joule
256) In CRO the gird is at.........potential with respect to cathode
a) Positive b) Negative ✔ c) Zero d) None of these
257) The number of electrons accelerated by anodes in CRO is controlled by:
a) Anode b) Cathode c) Filament d) Grid ✔
258) The unit of the ratio of electric field to that of magnetic field is the same as that of
a) velocity ✔ b) acceleration c) mass d) time
259) In velocity selector a charged particle will go undeflected if its velocity v is equal to
a) E+B b) EB c) E/B ✔ d) B/E

260) When current pass through a solenoid it behaves like a
a) Circular magnet b) Bar Magnet ✔ c) Compass d) Wire
261) Magnetic field intensity at a point due to the current carrying conductor can be determined by
a) Ampere's law ✔ b) Faraday's lawc) Ohm's law d) Newton's law
262) If the number of turns become double but length remain same then magnetic field in the solenoid become
a) Zero b) Remain same ✔ c) Half d) Double
263) When a conductor moves across a magnetic field, an emf is set up , this emf is called.
a) induced emf b) mutual emf ✔ c) self emf d) motional emf
264) A metal rod of 2 m is moving at a speed of 1 ms-1 in a direction making an angle 300 with 0.5 T magnetic field . The emf produced is .
a) 0.1V b) 0.5V ✔ c) 1 V d) 2 V
265) Energy stored per unit volume inside a solenoid is called
a) Electric flux b) Energy density ✔ c) Workd) Power
266) Domains contain atoms
a) 103 to 106 b) 106 to 109 c) 109 to 1012 d) 1012 to 1016 ✔
267) Best hard magnetic material is made up of
a) Alnico V ✔ b) Iron c) Nickel d) Cobalt
268) The phase difference between the input and output signal of an op-amp as an inverting amplifier is:
a) 0^o b) 60^o c) 90o d) 180^o ✔
269) If an electron jumps from nth orbit of energy En to pth orbit of energy Ep and a photon of frequency f is emitted then
a) $hf=E_n - E_p$ ✔ b) $hf=E_P.E_n$ c) $hf=E_P +E_n$ d) None of these
270) Application of wave nature of particle is
a) Photodiode b) Electron microscope ✔ c) Compound microscope d) Photocell
271) When a metal is heated sufficiently electrons are given off by the metal This phenomenon is known as
a) Photoelectric effect b) Piezoelectric effect c) Secondary emission d) Thermionic emission ✔
272) Compton shift in the wave length will be minimum when angle of scattering is
a) 0^o✔ b) 60^o c) 90^o d) 270^o
273) The materialization of energy takes place in the process of
a) Photoelectric effect b) Compton effect c) Pair production ✔ d) Annihilation of matter
274) Which nature of light is revealed by photoelectric effect?
a) Dual b) Corpuscular ✔ c) Waved) Elecromagnetic
275) The minimum energy required for pair production is
a) 0.51 MeV b) 1.02 MeV ✔ c) 2. 52 MeV d) 3.2 MeV
276) According to Heisenberg's first uncertainty principle ,the product of momentum and position of a particle is approximatly equal to
a) Stepahn's constant b) Rydberg's constant c) Planck's constant ✔ d) Wein's constant
277) In order to reduce uncertainty in momentum ,one must use light of
a) Short wavelength b) Long wavelength ✔ c) Intermediate wavelength d) Infinite wavelength
278) In order to determine the position of an electron with more accuracy, we must use light of
a) Short wavelength ✔ b) Long wavelength c) Medium wavelength d) Infinite wavelength
279) Heisenberg received Noble prize in:
a) 1920 b) 1940 c) 1925 d) 1932 ✔
280) The element formed by radioactive decay is called
a) Father element b) Mother element c) Parent element d) Daughter element ✔

Q.NO.2 (Short Questions)

1.	What is the energy of a photon in a beam of infrared radiation of wavelength 1240 nm?
2.	If $^{233}_{92}U$ decays twice by α - emission , what is the resulting isotope ?
3.	Define mass defect and binding energy ?
4.	How much energy released when 1 amu converted into energy ?
5.	What do you understand by radioactivity ?
6.	Differentiate between parent and daughter element ?
7.	What is radioactive decay ? Give an example ?
8.	What is natural radioactivity ? Name types of radiations emitted from radioactive elements ?
9.	What will be the change in mass number and charge number during alpha decay ?
10.	What are artificial radioactive elements?
11.	Define half-life and discuss its dependence ?
12.	Define half-life of radioactive element. How can you estimate the number of undecayed atoms after n half

lives?

13. How α and β particles may ionize an atom without directly hitting the electrons ? Explain .
14. Define fluorescence . Name two fluorescence substances ?
15. Describe a brief account of interaction of various types of radiations with matter ?
16. Write down two advantages of solid state detector over Geiger Muller Counter ?
17. Discuss the advantages and disadvantages of nuclear power compare to the use of fossil fuel generated power ?
18. Define nuclear fission . Give two examples of such a reaction.
19. Differentiate between controlled and un-controlled chain reaction ?
20. Write down two expected nuclear reactions for fission to indicate daughter nucleii ?
21. Explain briefly fission chain reaction ?
22. Distinguish between nuclear fission and nuclear fusion ?
23. State the advantages and disadvantage of nuclear power ?
24. Write any two uses of radiography ?
25. What is radioactive tracer ? Describe on application in medicine and agriculture ?
26. Differentiate between Baryons and Mesons ?
27. Protons and neutrons are formed by what type of quarks ? Show the diagram ?
28. Differentiate between Hadrons and Laptons ?
29. Write postulates of Bohr's model of H-atom ?
30. Find speed of electron in the 1^{st} Bohr orbit ?
31. Differentiate between characteristic X-rays and continuous X-rays.
32. Differentiate between normal population and population inversion ?
33. Explain de-Broglie's interpretation of Bohr's orbit to show that $mvr = \frac{nh}{2\pi}$
34. Derive the expression for the wavelength of the hydrogen spectrum using Bohr's third postulate.
35. Briefly describe the nature of radiations emitted from a radioactive materials.
36. What are black body radiations and how can you get a black body ?
37. Give the Planck's explanation of the radiation emitted by a black body.
38. Photoelectric effect gives the evidence of the particle nature of light . Explain it how ?
39. What do you understand by work function and stopping potential ?
40. Define Compton Effect . Write formula of Compton shift for scattering angle θ ?
41. What is the Compton shift in the wavelength of a photon scattered at an angle of 90^o?
42. What is wave particle duality ? Give its one practical use .
43. What changes Heisenberg made in his uncertainity principles after more careful calculations?
44. Give the two statements of uncertainity principle.
45. The life time of an electron in an excited state is 10 s . What is its uncertainity in energy during this time ?
46. Draw and discuss the characteristic curve of photocurrent vs applied voltage for light of different frequencies.
47. How the curve of photocurrent and applied voltage varies for different intensities of monochromatic light? Explain
48. State de Broglie hypothesis and give its formula.
49. What is the potential barrier ? What is the value of potential barrier of Si and Ge ?
50. What is the effect of forward and reverse biassing of a diode on the width of depletion region ?
51. What is the role of potential barrier in a diode ? How is it formed in a diode ?
52. Draw a circuit used for full wave rectification . Show direction of current in the circuit when positive half of input AC cycle passes through it ?
53. Describe the variation of reverse current with the intensity of light exposed on a photo diode using graph.
54. What is the biasing requirement of the junctions of an n-p-n transistor for its normal operation ?
55. Discuss the types of a transistor.
56. Describe the main characteristics of the three regions of a transistor.
57. Define voltage gain of a transistor as an amplifier. Give its mathematical expression ?
58. Define input and output resistance of an operational amplifier ?
59. Define Open Loop gain of operational amplifier . Also give its formula ?
60. Write the equation for the gain of inverting amplifier ?
61. Differentiate between half wave and full wave rectification ?
62. Draw the circuit diagram of operational amplifier as an inverting amplifier and label it.
63. Differentiate between ductile and brittle substances . Give an example for each ?
64. Define ultimate tensile stress (UTS

65.	Define Modulus of Elasticity . Write down its three kinds ?
66.	Compare the electrical behavior of conductor and semi - conductor in terms of energy band theory ?
67.	Differentiate between Insulators and Conductors ?
68.	What are the two main differences between conductors and semiconductors ?
69.	Carbon , Silicon and Germanium have four valence electrons . Why Carbon is insulator while Silicon and Germanium are Semiconductors ?
70.	What is the difference between intrinsic and extrinsic semiconductors ?

Q.NO.3 (Short Questions)

71.	Differentiate between p - type semiconductor and n - type semiconductor ?
72.	Show that how n- type semiconductor is formed from pure silicon with schematic diagram.
73.	What is high temperature superconductor? Give an example.
74.	Distinguish between soft magnetic materials and hard magnetic materials ?
75.	Energy dissipated per cycle for steel is more as compared to iron . Why ?
76.	What is doping? What is its effect on the electrical behaviour of a semiconductor?
77.	Why is power dissipated zero in pure inductive and pure capacitive circuit ?
78.	Show that for RC circuit , the angle between current and voltage is given as $\theta = \tan^{-1}\frac{1}{\omega RC}$
79.	How can you establish the formula for power in A.C circuits ? Explain the role of power factor in it ?
80.	What is the condition of resonance for RLC series resonance circuit? Also derive relation of resonant frequency.
81.	At resonance frequency the impedance of RLC series circuit is only resistive . Why ?
82.	Write the conditions under which electromagnetic waves are produced from a source ?
83.	Draw and discuss current frequency diagram of RLC series resonance circuit.
84.	State Faraday's law of electromagnetic induction ?
85.	Discuss briefly that Lenz's law is exactly in accordance with the law of conversation of energy.
86.	State the Len's Law ?
87.	On what factors , the mutual inductance of two coils depends ?
88.	Define mutual induction and mutual inductance.
89.	Define self-induction and mutual induction ?
90.	What are the factors on which maximum value $\in_0$ of emf induced across terminals or armature of an A.C generator depend ?
91.	What happen to the current of a circuit if a load resistance of the circuits is much less than the power transferred ?
92.	Write characteristics of electric field lines ?
93.	How sharks locate their prey ? Explain briefly .
94.	Define electric flux . Write its SI units ?
95.	What is the orientation of the surface in an electric field to get maximum flux through it ?
96.	What are the factors upon which the electric flux depends ?
97.	What is strength of electric field inside a hollow charged sphere and why ?
98.	What is difference between electrical potential energy and electrical potential difference ?
99.	What is meant by EEG and ERG ?
100.	Define electric potential difference with units ?
101.	Show that $E = \frac{\Delta V}{\Delta r}$
102.	A particle carrying a charge of 5e falls through a potential difference of 10.0V . What will be then energy acquired by it ?
103.	Differentiate between electrical potential difference and electric potential at a point ?
104.	Show that 1 eV = 1.6×10^{-19} J .
105.	Define electrons volt , give its mathematical form ?
106.	Convert 1 joule into electron - volt ?
107.	A particle carrying a charge of 2e falls through a potential difference of 3.0V. Calculate the energy acquired by it ?
108.	When the electrons fall through a potential difference of 1.0 Volt . Find its energy in electron volts ?
109.	Write the differences between electrical and gravitational force ?
110.	Why does capacitance of a capacitor increase when a dielectric material is inserted between its plates ?
111.	How will capacitance of parallel plate capacitor be affected if area of plates is doubled and separation between them is halved ?
112.	Define dielectric constant and write its formula ?

113. Verify that an ohm times Farad is equivalent to second ?
114. What depend on the slow or fast charging and discharging of a capacitor ?
115. What is time constant ?
116. How much is the amount of charge at start of discharging of capacitor and start of charging of a capacitor ?
117. Define temperature coefficient of resistance . Give its unit ?
118. Can you describe some substances whose resistance decrease with increase in temperature?
119. What is meant by Tolerance ? Also give one example .
120. Find the resistance of a resistor with red , green , orange and gold respective bands ? What is its tolerance?
121. A potential difference is applied across the ends of a copper wire . What is the effect on the drift velocity of the free electrons by increasing the potential difference ?
122. Why the terminal potential difference of a battery decreases when the current drawn from it is increased ?
123. What is the difference between electromotive force and terminal potential difference ?
124. A potential difference is applied across the ends of a copper wire . What is the effect on the drift velocity of free electrons by decreasing the length and temperature of the wire ?
125. Briefly describe the current through a metallic conductor and drift velocity ?
126. Why does no current pass through galvanometer in a balanced wheat stone bridge although the two keys in the circuit are closed ?
127. Define Electric power. Write its three equations for power dissipation in a resistor.
128. Define Kirchhoff 2nd rule.
129. Distinguish between magnetic flux and magnetic flux density . Write their SI units ?
130. Define magnetic flux density and give its equation ?
131. Mention the factors upon which magnetic flux depends ?
132. Why is B non - zero outside a solenoid ?
133. State Ampere's law . Write down its formula ?
134. Briefly give the function of Filament , Cathode , Gird and plates in C.R.O. ?
135. Write any two uses of CRO ?
136. What is the function of grid in cathode ray oscilloscope ?
137. Draw Saw tooth voltage wave form and describe it ?
138. What is Time Base Generator ?
139. How can you explain the waveform of various voltages formed in CRO ?
140. How the beam of electron is focused on the screen of CRO ? Show it with diagram .

Q.NO.4 (Short Questions)

141. How a current carrying coil is to be placed in a magnetic field so that torque acting upon it becomes zero ?
142. How can the radius of electron trajectory be measured to determine e/m of an electron ?
143. What is an amplifier? Show the biasing of transistor as a CE amplifier using circuit diagram
144. Define energy density. Write its expression for a capacitor.
145. On what factors does the energy stored in a capacitor depend upon?
146. What is the result of Millikan's oil drop method?
147. Is electron volt a unit of potential difference or energy? Explain.
148. State Gauss's law and write its mathematical expression.
149. Does the total flux depend upon the shape or geometry of the closed surface ?
150. Suggest a method to " shield " an apparatus from electric field even when it is to be kept in the region where electric field is present ?
151. How can a rheostat be used as a variable resistor?
152. What is thermistor? Describe its construction and uses.
153. Which is preferred for measuring emf of a cell, a voltmeter or a potentiometer?
154. What is potentiometer, gives its uses?
155. What is Wheatstone bridge? How can it be used to determine an unknown resistance?
156. A potential difference is applied across the ends of a copper wire . What is the effect on the drift velocity of the free electrons by a
157. Why the terminal potential difference of a battery decreases when the current drawn from it is increased ?
158. Find the resistance and tolerance of a resistor having color bands starting with brown , green , red and finishes with gold ? What is its tolerance?
159. What is the resistance of colour code resistor having colours yellow , white , orange and silver respectively? What is its tolerance ?
160. Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate ? Explain .

161.	How can a current loop be used to determine the presence of a magnetic field in a given region of space ?
162.	How the torque is produced in current carrying rectangular coil?
163.	State the principle to determine the charge to mass ratio of an electron?
164.	Suppose that a charge " q " is moving in a uniform magnetic field with a velocity v . Why is there no work done by the magnetic force that acts on the charge " q " ?
165.	A plane conducting loop is located in a uniform magnet field that is directed along x-axis for what orientation of loop is flux, a maximum? For what orientation is flux, a minimum?
166.	A current in a conductor produces a magnetic field , which can be calculated by using Ampere's law . Since current is defined as the rate of flow of charge , what can you conclude about the magnetic field due to stationary charges ? What about moving charges ?
167.	At a given instant , a proton moves in positive x direction in a region where there is a magnetic field in the negative z direction . When is direction of magnetic force ?
168.	Why does the picture on a TV screen become distorted when a magnet is brought near the screen ?
169.	How can we determine the direction of magnetic field due to current carrying solenoid?
170.	Can a charged particle move through a magnetic field without experiencing any magnetic force ? If so then how ?
171.	Does the induced emf in a circuit depend on the resistance of the circuit? Does the induced current depend on the resistance of the circuit?
172.	A square loop of wire is moving through a uniform magnetic field. The normal to the loop is oriented parallel to the magnetic field. Is emf induced in the loop? Give a reason for your answer ?
173.	How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
174.	In a certain region the earth's magnetic field point vertically down. When a plane north, which wingtip is positively charged?
175.	Is it possible to change both the area of the loop and magnetic field passing through the loop and still have no induced emf in the loop? Explain briefly .
176.	Considering induced emf produced by A.C generator of loop resistance R , correlate the instantaneous emf and maximum emf . Also instantaneous current and maximum current ?
177.	A glass rod length " L " is moving perpendicular to the applied magnetic field B with velocity v. Explain briefly about the induced emf in it ?
178.	A light metallic ring is released from above into a vertical bar magnet with South pole to the upside. Does the current flow clockwise or anticlockwise in the ring?
179.	What is energy density of solenoid? On what factors does it depend?
180.	A circuit contains an iron cored inductor, a switch and a DC source arranged in series. The switch is closed and after an interval reopened. Explain why a spark jumps across the switch contacts?
181.	In R-L circuit, will the current lead or lag the voltage? Illustrate your answer by a vector diagram.
182.	What is meant by Hysteresis loss ? How is it used in the construction of transformer?
183.	What is meant by para, dia and ferromagnetic substances ? Give example for each ?
184.	What is meant by strain energy? How can it be determined from the force extension graph ?
185.	Differentiate between tensile and shear modes of stress and strian ?
186.	Define stress and strain . What are their SI units ?
187.	How operational amplifier is used as Comparator?
188.	What is a light dependent resistance? How does it work?
189.	Why a photodiode is operated in reverse biased state?
190.	What is biasing requirement of the junctions of a transistor for its normal operation? Explain how these requirements are met in a common emitter amplifier?
191.	How does the motion of an electron in an n-type substance differ from the motion of holes in a p-type substance?
192.	Bohr's theory of hydrogen atom is based on several assumption. Do any of three assumptions contradict classical physics?
193.	Explain why laser action could not occur without population inversion between atomic levels?
194.	As a solid is heated and begins to glow , why does it first appear red ?
195.	What happens to the total radiations from a black body if its absolute temperature is doubled ?
196.	When light shines on surface , is momentum transferred to metal surface ?
197.	If an electron and proton have the same de-Broglie wavelength which particle has greater speed?
198.	We do not notice the de-Broglie wavelength for a pitched cricket ball . Explain why ?
199.	Is it possible to create a single electron from energy ? Explain .
200.	Does brightness of beam of light primarily depends upon the frequency of photons or on the number of

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photons?

201. If the following particles have same energy which has the shortest wavelength? Electron, alpha particle, neutron and proton.

202. What advantages an electron microscope has over an optical microscope ?

203. When does light behave as a wave ? When does light behaves as a particle ?

204. Why don't we observe a Compton Effect with visible light ?

205. Will the bright light eject more electrons from a metal surface then dimmer light of the same colour?

206. A beam of red light and a beam of blue light having exactly the same energy . Which beam contains the greater number of photons?

207. Will higher frequency light eject greater number of electrons than low frequency light ?

208. Since mass is a form of energy, can we conclude that a compressed spring has more mass than the same spring when it is not compressed.

209. Derive the relation between energy and momentum of the electromagnetic radiations.

210. Why radio waves are detected as continuous radiations and not by a radiation detector or counter?

211. Why quantum effects are only important for atomic sized objects?

212. A particle and its anti-particle cannot exist together at one place. Why?

Long Questions

1. What are postulates of Bohr's model of the hydrogen atom? Derive formula for nth orbit radius of Bohr atom model and show that radii of hydrogen atom are quantized?

2. What is meant by inner shell transitions & characteristic X-rays? How X-rays are produced? Write down any two properties and uses of X-rays.

3. What is radioactive decay? Discuss emission ofα, β and γ particle from radioactive nuclei in detail.

4. What is Nuclear Fission ? Explain Fission Chain Reaction in detail ?

5. What is nuclear fusion ? Why this reaction has not been brought under control ? How sun is issuing out tremendous amount of energy ?

6. What are the black body radiations? Explain the intensity distribution diagram for the radiations emitted from a black body.

7. Define photoelectric effect. Describe the experiment for studying it and also give explanation of the experimental results on the basis of Quantum theory.

8. Explain Heisenberg's Uncertainty Principles.

9. What is p-n junction? How is it forward and reverse biased ? Draw circuits and give their characteristics ?

10. Define Strain Energy . Derive a relation for Strain Energy in deformed materials ?

11. Explain the behaviour of A.C through an inductor . Also show that the reactance of a coil depends upon the frequency of the A.C and inductance L .

12. Describe the behaviour of R-L series circuit with an A.C source. Calculate the impedance and phase angle by drawing the impedance diagram?

13. State Lenz's law. Explain how it explains conservation of energy during electromagnetic induction ?

14. Define electric potential . Derive on equation for electric potential at a point due to a point charge ?

15. Describe Millikan's Oil drop method for determination of charge on an electron ?

16. Define capacitance . Derive the expression for capacitance of a parallel plate capacitor ?

17. What is the capacitor ? Show that energy density for a capacitor which has electric field strength E is given by $\frac{1}{2}\omega_r\omega_0E^2$

18. What is capacitance? An expression for the capacitance of a parallel plate capacitor when vacuum is present between the plates of capacitor ?

19. State and explain Kirchhoff's rules in detail.

20. What is wheat stone bridge ? Describe its construction and working . How can it be used to find the unknown resistance of a wire ?

21. What is Potentiometer ? How it can be used as(i) Potential Divider (ii) Measuring of emf of a cell

22. Derive an expression for force acting on a current carrying conductor of length L placed in a uniform magnetic field of strength B ?

23. Determine an expression for the charge to mass ratio of an electron ?

24. What is Gauss's law? Derive an expression for the electric field at a point near an infinite sheet of charge.

25. Define A.C. generator.Give its principle, construction and working derive an expression for induced emf.

26. What is RLC parallel circuit? Find the value of the resonance frequency and also write its properties.

27. Distinguish between extrinsic and intrinsic semiconductors. How would you obtain n-type and p-type material from pure silicon? Illustrate it by schematic diagram.

28. Describe the formation of energy bands in solids. Explain the difference amongst electrical behaviour of conductors , insulators and semi - conductors in terms of energy band theory.

29. Define modulus of elasticity . Show that units of modulus of elasticity and stress are same. Also discuss its three

kinds.

NUMERICAL PROBLEMS

1. A particle having a charge of 20 electrons on it falls through a potential difference of 100 volts. Calculate the energy acquired by it in electron volts (eV)
2. A capacitor has a capacitance of 2.5×10^{-8} F. In the charging process, electrons are removed from one plate and placed on the other one. When the potential difference between the plates is 450 V, ho many electrons have been transferred? ($e = 1.6 \times 10^{-19}$ C
3. The potential difference between the terminals of a battery in open circuit is 2.2 V. When it is connected across a resistance of 50 Ω, the potential falls to 1.8 V. Calculate the current and the internal resistance of the battery.
4. A platinum wire has resistance of 10 Ω at 0°C and 20 Ω at 273°C. Find the value of temperature coefficient of resistance of platinum.
5. The resistance of an iron wire at 0°C is 1×10^{4} Ω. What is the resistance at 500°C if the temperature coefficient of resistance of iron is 5.2×10^{-3} K^{-1} ?
6. 0.75 A current flows through an iron wire when a battery of 1.5 V is connected across its ends. The length of the wire is 5.0 m and its cross sectional area is 2.5×10^{-7} m^{2}. Compute the resistivity of iron.
7. A rectangular bar of iron is 2 cm by c cm in cross section and 40 cm long . Calculate its resistance if the resistivity of iron is 11×10^{-8} Ω m .
8. A solenoid 15.0 cm long has 300 turns of wire. A current of 5.0 A flows through it. What is the magnitude of magnetic field inside the solenoid?
9. Find the radius of an orbit of an electron moving at a rate of 2.0×10^{7} ms^{-1} in a uniform magnetic field of 1.20×10^{-3} T.
10. Alpha particles ranging in speed from 1000 ms^{-1} to 2000 ms^{-1} enter into a velocity selector where the electric intensity is 300 Vm^{-1} and the magnetic induction 0.20 T. Which particle will move undeviated through the field?
11. How fast must a proton move in a magnetic field of 2.50×10^{-3} T such that the magnetic force is equal to its weight?
12. A coil of 0.1 m × 0.1 m and of 200 turns carrying a current of 1.0 mA is placed in a uniform magnetic field of 0.1 T. Calculate the maximum torque that acts on the coil.
13. A power line 10.0 m high carries a current 200 A. Find the magnetic field or the wire at the ground.
14. A square coil of side 16 cm has 200 turns and rotates in a uniform magnetic field of magnitude 0.05 T. If the peak emf is 12 V, what is the angular velocity of the coil?
15. A coil of 10 turns and 35 cm^{2} area is in a perpendicular magnetic field of 0.5 T. The coil is pulled out of the field in 1.0 s. Find the induced emf in the coil as it is pulled out of the field.
16. An alternating source of emf 12 V and frequency 50 Hz is applied to a capacitor of capacitance 3 μF in series with a resistor of resistance 1k Ω. Calculate the phase angle.
17. An indutor of inductance 150 μH is connected in parallel with a variable capacitor whose capacitance can be changed from 500 pF to 20 pF. Calculate the maximum frequency and minimum frequency for which the circuit can be turned.
18. A 1.25 cm diameter cylinder is subjected to a load of 2500 kg. Calculate the stress on the bar in mega pascals.
19. A 1.0 m long copper wire is subjected to stretching force and its length increases by 20 cm. Calculate the tensile strain and the percent elongation which the wire undergoes.
20. In a certain circuit, the transistor has a collector current of 10 mA and a base current of 40 μA. What is the current gain of the transistor?
21. The current flowing into the base of a transistor is 100 μA. Find its collector current I_C, its emitter current I_E and the ratio I_C/I_E if the value of current gain β is 100
22. Assuming you radiate as does a blackbody at your body temperature about 37°C, at what wavelength do you emit the most energy?
23. A 50 KeV photon is Compton scattered by a quasi-free electron. If the scattered photon comes off at 45°, what is its wavelength?
24. An electron is accelerated through a Potential Difference of 50 V. Calculate its de Brogile wavelength.
25. The life time of an electron in an excited state is about 10^{-8} s. What is its uncertainty in energy during this time?
26. An electron is to be confined to a box of the size of the nucleus (1.0×10^{-14} m
27. . What would the speed of the electron be if it were so confined?
28. X-rays of wavelength 22 pm are scattered from a carbon target. The scattered radiation being viewed at

85° to the incident beam. What is Compton shift?

29. A 90 Kev x-ray photon is fired at a carbon target and Compton scattering occurs. Find the wavelength of the incident photon and the wavelength of the scattered photon for scattering angle of (a) 30° (b) 60°.

30. What is the maximum wavelength of the two photons produced when a positron annihilates an electron? The rest mass energy of each is 0.51 MeV.

31. What is the Broglie wavelength of an electron whose kinetic energy is 120 eV?

32. What are the energies in eV of quanta of wavelength? λ = 400, 500 and 700 nm.

33. Electrons in an X-ray tube are accelerated through a potential difference of 3000 V. If these electrons were slowed down in a target, what will be the minimum wavelength of X-rays produced?

34. A tungsten target is struck by electrons that have been accelerated from rest through 40 kV potential differences. Fin the shorter wavelength of the bremsstrahlung radiation emitted?

35. Find the speed of electron in the First Bohr Orbit.

36. Find the mass defect and binding energy of the deuteron nucleus. The experimental mass of deuteron is 3.3435×10^{-27} kg.

37. Find the mass defect and the binding energy for tritium, if the atomic mass of tritium is 3.016049 u.

38. A sheet of lead 5.0 mm thick reduces the intensity of beam of γ -rays by a factor 0.4. Find half value thickness of lead sheet which will reduce the intensity to half of its initial value?

39. You are asked to design a solenoid that will give a magnetic field of 0.10 T, yet the current must not exceed 10.0 A. Find the number of turns per unit length that the solenoid should have.

40. An alternating current generator operating at 50 Hz has a coil of 200 turns. The coil has an area of 120 cm^2. What should be the magnetic filed in which the coil rotates in order to produce an emf of maximum value of 240 volts?

41. A coil of wire has 10 loops. Each loop has an area of 1.5×10^{-3} m^2. A magnetic field is perpendicular to the surface of each loop at all time. If the magnetic field is changed from 0.05 T to 0.06 T in 0.1 s, find the average emf induced in the coil during this time.

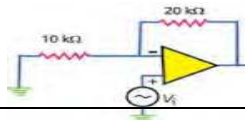
42. A solenoid has 250 turns and its self inductance is 2.4 mH. What is the flux through each turn when current is 2A? What is the induced emf when the current changes at 20 As^{-1}?

43. A solenoid of length 8.0 cm and cross sectional area 0.5 cm^2 has 520 turns. Find the self inductance of the solenoid when the core is air. if the current in the solenoid increases through 1.5 A in 0.2 s, find the magnitude of induced emf in it.

44. Like any field, the earth's magnetic field stores energy. Find the magnetic energy stored in a space where strength of earth's field is 7×10^{-5} T, if the space occupies an area of 10×10^{8} m^2 and has a height of 750 m.

45. A sinusoidal A.C. has a maximum value of 15A. What are its rms values? If the time is recorded from the instant the current is zero and is becoming positive, what is the instantaneous value of the current after 1/300 s, given the frequency is 50 Hz.

46.

47. Calculate the gain of non-inverting amplifier shown in the fig.

May all your hard works before the exam be rewarded with the best.
May you obtain the highest marks and your success be continued.